

Chapter 2

Forestwide Standards and Guidelines



Cover photo: Barred owl

Photographer: Gary Schmidgall, retired USFS

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Introduction

Standards and guidelines are permissions or limitations that apply to on the ground implementation of management practices. The standards and guidelines in this Chapter apply to all management practices for the entire Mark Twain National Forest. Additional standards and guidelines, shown in Chapter 3, apply to each management prescription. Where Forestwide standards and guidelines are different from those for a management prescription, the management prescription standard applies. If a specific resource is not addressed in a management prescription, then only the Forestwide Standards and Guidelines apply. In addition, federal and state laws, regulations, and the Forest Service directives system always apply even though they may not be cited in the management prescription.

A Standard is defined as a course of action or a level of attainment that must be reached to achieve Forestwide goals. In general, standards limit project-related activities—not compel or require them. Deviations from Standards requires a Forest Plan amendment and must be analyzed and documented in an environmental analysis.

Standards are written in the imperative sentence structure (for example, “Maintain a minimum of 10% of the harvested stand in reserve trees and or reserve tree groups in all even-aged regeneration harvests”). Standards use verbs that convey mandatory compliance such as “must,” “must not,” “shall,” or “shall not.” In this Forest Plan, **standards are displayed in bold text.**

A Guideline is a course of action that should be followed in most circumstances. However, Guidelines relate to activities where site-specific factors may require some flexibility. Deviations from a Guideline must be analyzed and documented in a project level analysis but do not require a Forest Plan amendment.

Guidelines use words and phrases that convey more discretionary guidance, such as “should,” “should not,” “may,” “as needed,” and “where possible.” Guidelines may also provide specific exceptions to Standards. In this Forest Plan, guidelines are displayed as normal text.

This set of Standards and Guidelines is designed to be specific to the Mark Twain National Forest. Both Forestwide and Management Area prescription standards and guidelines apply to the site-specific decision-making process for projects and activities on the Mark Twain. These standards and guidelines are written to meet, at a minimum, all requirements of applicable laws, regulations, Forest Service directives, and State standards. Existing laws, regulations and directives are generally not repeated in the Forest Plan, although references to particular laws or directives may be included to provide needed emphasis for the protection and management of specific resources. Most standards and guidelines serve as mitigation measures to reduce or eliminate adverse effects. Singularly and collectively, they avoid, rectify, reduce, or eliminate the potential negative environmental effects of future management actions. Programmatic direction may be altered at the site-specific level to require additional environmental protection, as necessary.

Standards and Guidelines apply to normal activities. When needed to deal with catastrophic events, actions that deviate from standards may be implemented, with Forest Supervisor approval.

Vegetation Management

Additional vegetation management direction can be found in Forest Service Manual 2070.

Mimic ecosystem dynamics, patterns, and disturbance processes to achieve desired conditions except where ecological recovery is unlikely or unfeasible.

Plan salvage activities to retain 10-15% of the affected area, unless the area presents an unacceptable risk to public health or safety, or threatens forest health. These areas should be in a variety of patch sizes and distributions on the landscape.

Do not exceed the soil's nutrient retention capacity when applying fertilizer.

Non-Native Invasive Species (NNIS) Management

Additional direction for NNIS management can be found in Forest Service Manual 2080.

Prioritize areas of NNIS for treatment based on threats to resources, species status, relationship to boundaries, size of the infestation, potential for further spread and effectiveness of available control measures.

Include NNIS control and prevention clauses in contracts and permits as needed.

Revegetate soils disturbed by National Forest management activities by allowing growth of existing on-site vegetation where possible and desirable.

Where on-site vegetation is not desirable, or not likely to quickly revegetate the site, use one or more of the following methods:

- **Fertilize to encourage growth of desirable on-site vegetation;**
- **Apply local surrounding organic mulch (i.e., leaf litter and pine needles) or covering with sterile weed-free straw to promote reestablishment of native vegetation;**
- **Reseed or replant with native species appropriate to the site or sterile annuals (wheat, rye, etc.) and fertilizing if necessary; or**
- **Scarify to establish seed bed.**

Although the use of native plants is preferred, non-native, non-invasive species may be used in areas such as recreation areas, administrative sites, artificial openings, and improved cool season pastures.

Use weed-free plant materials when restoring natural communities or planting warm season/cool season grasslands.

Grazing of *cattle, horses, and other livestock* may be used for biological control of NNIS.

Water and Soil Resource Management

Additional management direction for water and soil resources can be found in Forest Service Manual 2510, 2520, 2530, 2540, and 2550 as well as Forest Service Handbooks 2509.13 through 2509.18.

Riparian Management Zone (RMZ)

Definition

Multiple features, used to delineate the Riparian Management Zone (RMZ) boundaries, include the following characteristics:

- Landform—floodplains, toe slope to toe slope as well as other natural breaks or man-made barriers (i.e., a road could be a break point used to delineate a boundary);
- Associated current and potential terrestrial natural communities—stream edge, sand bar, gravel wash, river front forest, wet bottomland forest, wet-mesic bottomland forest, swamp, marsh, fen, and in some cases, dry-mesic and mesic bottomland forest;
- Soils—soils formed in alluvial parent materials (see Appendix B); and
- Hydrology—the actual stream routes (flowing as well as some losing stream reaches), springs, water bodies, some wetlands, and seeps that are adjacent to the stream course as well as the area critical to the functionality of the riparian area (i.e. area that dissipates flood waters).

Delineate the RMZs at the project level, using the best available information for landform, terrestrial natural communities, soils, and hydrology for each location.

In cases where the RMZ boundary cannot be effectively determined using the characteristics described above, set the RMZ boundary at least 100 feet horizontal distance from the top of each bank.

The RMZ continues upstream until a well-defined floodplain, continuous flow, or permanent pools cease to exist or the riparian natural communities are no longer present.

Management

See Standards and Guidelines for specific activities for more information.

Allow vegetation management within the RMZ only to move toward the desired condition.

Close and rehabilitate existing wildlife food plots in the RMZ.

Within the RMZ the following activities are prohibited:

- Pond fertilization;
- Mechanical constructed firelines for prescribed burns;
- Grazing within 100 feet of streambanks;
- Fertilization;
- Construction of sanitation facilities;
- New roads, unless no feasible alternatives;
- New motorized trails (except at designated crossings);
- Timber management (unless needed to move toward desired condition, or for some salvage);
- Drilling and associated structures;
- Servicing of equipment;

- **New man-made impoundments, mine tailing ponds, and water diversion structures;**
- **Maintenance of existing wildlife food plots;**
- **Construction of new wildlife food plots;**
- **Maintenance of existing wildlife openings (unless naturally occurring);**
- **Construction of new wildlife openings;**
- **Wildlife pond construction;**
- **Log landings; and**
- **Use of chemicals (unless needed to move towards desired condition).**

Within the RMZ the following activities should be avoided whenever possible:

- Placement of livestock distribution tools (water tanks, salt blocks, etc.);
- New recreational facilities and opportunities;
- Equipment operation;
- Mechanically constructed firelines for suppression;
- Temporary roads;
- Stream channel crossings;
- Removal of mineral material from stream channels; and
- Modification of beaver-created impoundments.

Watercourse Protection Zone (WPZ)

Definition

Watercourse Protection Zones (WPZ) are delineated along all stream channels that have defined banks and streambed, show signs of annual scour, have accumulated sediment and gravel of various sizes within the streambed, and are not included in the RMZ.

The WPZ extends 100 feet horizontal distance from each side of the stream channel (measured from the upper break of the stream bank or channel edge), or to the break of the adjacent ridge, whichever is closer.

Management

See Standards and Guidelines covering specific activities for more information.

Close and rehabilitate existing wildlife food plots in the WPZ.

Within the WPZ the following activities are prohibited:

- **Fertilization;**
- **Timber management within 25 feet of stream *unless necessary to move the area towards the desired condition or to facilitate designated crossings;***
- **Servicing of equipment**
- **Log landings;**
- **New roads, unless no feasible alternative;**
- **Temporary roads except at designated locations;**
- **Maintenance of existing wildlife food plots;**

- **Construction of new wildlife food plots;**
- **Maintenance of wildlife openings, unless naturally occurring;**
- **Wildlife pond construction; and**
- **Use of chemicals (unless needed to move towards the desired condition).**

Within the WPZ the following activities should be avoided whenever possible:

- Mechanically constructed firelines for prescribed burns;
- Placement of livestock distribution tools (water tanks, salt blocks, etc.);
- New recreational facilities and opportunities;
- Construction of sanitation facilities;
- Drilling and associated structures;
- New man-made impoundments, mine tailings ponds and water diversions structures;
- Equipment operation;
- Mechanically constructed firelines for suppression;
- Stream channel crossings;
- Use of chemicals (unless needed to move towards the desired condition), and
- Modification of beaver-created impoundments.

Soil Productivity

Design all ground disturbing activities to prevent or minimize rutting, erosion, compaction, rapid runoff, disruption of water movement, and distribution or loss of water and soil quality.

Prevent or minimize sedimentation by employing adequate erosion control measures where earth-moving activities unavoidably expose areas of soil for extended periods of time.

Minimize ground-disturbing activities on soils highly subject to compaction during wet periods.

Water Management

Prohibit permanent stream channelization on National Forest System lands.

Prohibit new constructed impoundments, mine tailing ponds, and water diversions within the RMZ.

Whenever possible, avoid new manmade impoundments, mine tailing ponds and water diversions within the WPZ.

Beaver-created impoundments should not be modified, except where human health and safety; private property; threatened, endangered, and sensitive species and their habitat; other riparian resources, or improvements such as roads, regulated dam spillways, bridges, or campgrounds are threatened.

Limit in-stream use of heavy equipment to the minimal amount of time necessary for completion of the project.

Design hydrologic control structures to mimic as much as possible the appearance and function of natural habitat features in the RMZ and WPZ.

Terrestrial and Aquatic Habitat Management

Additional management direction for wildlife, fish, plants and threatened, endangered and sensitive species resources can be found in Forest Service Manual 2600, Forest Service Handbook 2609.13, Executive Order 13186, and Missouri Code of State Regulations 10 CSR 20-7.

Threatened, Endangered, and Sensitive species (TES)

Carry out Forest Service responsibilities for the conservation of endangered and threatened species and habitat identified through interagency consultation with the U.S. Fish and Wildlife Service.

Manage federally listed species in accordance with approved species recovery plans (FSM 2672.21). Manage Regional Forester Sensitive Species (RFSS) in accordance with approved Conservation Agreements and Strategies.

Issue permits for the collection of federally listed threatened and endangered plant and animal species only if collector has a current U.S. Fish and Wildlife Service collecting permit.

Issue permits for collection of RFSS and state endangered plant and animal species only for scientific research.

Prohibit mechanical disturbance to rare plant sites.

Bald Eagle

Maintain suitable habitat for nesting, roosting, and foraging bald eagles. Protect all occupied nest sites from disturbance from January through July (or during active breeding, incubation, and brood rearing periods).

Conduct management activities planned near known nesting sites in a manner that protects the existing nest site, maintains suitable alternate nesting habitat, and occurs outside of the breeding, incubation, and brood rearing periods (approximately January through July).

In cooperation with U.S. Fish and Wildlife Service and Missouri Department of Conservation, develop educational signs regarding appropriate behavior near occupied bald eagle nests or near roosting eagles. Post signs at accesses on rivers or lakes where eagles may be present.

Designate a ¼ mile permanent old growth corridor along the waters' edge of Table Rock Lake and Lake Wappapello (traditional bald eagle wintering areas).

****All TES Bat Species****

Maintain trees with characteristics of suitable roosts (i.e., dead or dying with exfoliating bark or large living trees with flaking bark) wherever possible with regard for public safety and accomplishment of overall resource goals and objectives.

Identify and remove hazard trees between November 1 and April 1 whenever possible.

Using the current, accepted technology, determine the location of summer roost trees and foraging areas for ****all TES**** female bats.

Hibernacula

Prohibit removal of suitable roost trees and prescribed burning within the 20 acres of old growth and 130 acres of *mature* forest or mature woodland surrounding *a* threatened, endangered, candidate, proposed, or rare species of bat hibernacula during the swarming and staging periods. Determine dates individually for each cave (normally between September 1 and November 1 and between March 15 and April 30 respectively.)

The area around *TES* bat caves is a smoke-sensitive area. Develop prescribed burn plans to avoid or minimize smoke influences at or near these caves. Give the U.S. Fish and Wildlife Service an opportunity to review and comment on prescribed burn plans within these areas.

Other Roosting Structures

Conduct an evaluation for the presence of *threatened, endangered, candidate, proposed, or rare species of* bats prior to any decision to remove a building or bridge.

Bridges proposed for construction or reconstruction across streams that are 40 or more feet wide should be designed of concrete with girders or chambers to provide suitable bat roosting space underneath whenever possible.

Where populations of bats become a hazard or significant nuisance to human use of Forest Service facilities, exclusion techniques recommended by a biologist will be employed outside of the maternity season. If roost habitat is considered limiting in the area, bat boxes could be used to provide alternate habitat.

Indiana Bat

Maternity Colonies

If occupied Indiana bat maternity roost trees are discovered, protect them from physical disturbance until they naturally fall to the ground.

Based on site-specific consultation, designate an area of use (foraging and roosting) based on site conditions, radio-tracking or other survey information, and best available information regarding maternity habitat needs.

Minimize human disturbance in the maternity colony areas of use until the colony has left the maternity area for hibernation.

Conduct prescribed burning within the maternity colony area of use only during the hibernation season.

Maintain or enhance the character of the site year-round by:

- maintaining an adequate number of snags, including known roost trees;
- maintaining large live trees to provide future roosting opportunities; and
- maintaining small canopy gaps (and/or opening the mid-story) to provide a continual supply of foraging habitat.

Male Roost Trees

Protect known male roost trees from physical disturbance until they naturally fall to the ground.

Protect occupied Indiana bat male roost trees discovered during the summer season (not migration), from physical disturbance by designating a 75-foot radius buffer zone around the tree(s). The buffer zone shall remain in place until hibernation season begins (around November 1.)

Prohibit ground-disturbing activity or timber harvest within the buffer zone.

Prescribed burning may be done within the buffer zone if a fireline is manually constructed no less than 25 feet from, and completely around, the tree to prevent it from catching fire.

Hine's Emerald Dragonfly

Control non-native invasive and/or undesirable plant species in fen habitats through the most effective means while protecting water quality.

Restore local hydrology by eliminating old drainage ditches or other water diversionary structures when possible if such activities would not result in a loss of habitat.

Fens that harbor known populations of Hine's emerald dragonfly should be prescribed burned to control invasion of woody species or as part of larger landscape restoration and enhancement projects.

Prescribed burns on fens that harbor known or suspected populations of Hine's emerald dragonfly must be scheduled to occur from November through April.

Prohibit vehicle and heavy equipment use in fens, unless needed to improve HED habitat.

Control unauthorized vehicle access to fens.

****TES Aquatic Species****

For **all projects where in-stream **or streambank** work, **including but not limited to construction or maintenance of boat launches, river access structures** low-water crossings, or fords are proposed:**

- **Determine if suitable habitat for threatened, endangered or rare **aquatic** species is present **at or within 5 miles of the project site** before initiating any in-stream work.**
- **If suitable habitat is present, conduct specific biological surveys to determine the presence or absence of threatened, endangered or rare **aquatic** species.**
- **If threatened, endangered, or rare **aquatic** species are discovered during pre-work surveys, modify or re-locate the project to avoid or minimize impacts to **these species.****
- ****If threatened, endangered, or rare aquatic species are discovered during pre-work surveys, implement projects outside of appropriate breeding seasons when necessary.****
- **Design fish management projects to minimize impacts on host species for threatened and endangered mussel species.**
- ****Heavy equipment operation is prohibited at threatened, endangered, or rare aquatic species sites unless needed to implement a project approved by the U.S. Fish and Wildlife Service.****

****Running Buffalo Clover**

A running buffalo clover site is any area that contains one or more living RBC plants in close proximity to each other, and includes all the area within 50 feet of the outermost rooted crowns. Under consultation with the Forest botanist/ecologist, a site may be delineated with a radius other than 50 feet if site-specific conditions warrant.

Schedule prescribed burns at running buffalo clover sites to occur outside the season when plants are flowering and setting seed.

Prescribed burns at running buffalo clover sites should occur at intervals of 5 years or greater unless site specific monitoring by the Forest botanist indicates that a shorter burn interval may be needed to maintain running buffalo clover viability at the site.

Allow grazing on running buffalo clover sites only if needed to control vegetation competing with running buffalo clover.

The District or Forest wildlife biologist must approve the grazing schedule prior to any livestock use.

Allow mowing, plowing, disking, grazing, or other activities that disrupt running buffalo clover plants only after seed has set.

Timber harvests at running buffalo clover sites must use individual tree harvest methods.

Total basal area at a running buffalo clover site should not be reduced by more than 30 basal area in a single harvest.

Timber harvests at running buffalo clover sites should occur at least 10 years apart.**

Terrestrial Wildlife Habitat

Key habitat components to support the range of native terrestrial wildlife species are:

- Old growth habitat;
- Shrub, grass, or forb habitat (regeneration openings, savannas, open woodlands); and
- Grassland habitats.

Old Growth Habitat

The amount of old growth habitat to be provided is described in individual Management Prescriptions.

Use the following criteria when designating areas of permanent old growth:

- **A minimum of 15 acres in size, and preferably over 100 acres in size;**
- **Represent all forest, woodland, and savanna natural community types;**

- Normally include the oldest or largest average diameter stands that are at least 70 years old;
- Avoid designating permanent old growth in isolated National Forest tracts or in areas known to be old pine plantations;
- Give preference to habitat near management areas with limited vegetation management or along the edges of MA 1.1 and 1.2 to maximize the amount of contiguous area in old growth habitat; and
- **Designate as permanent old growth all stands or groupings of trees at least two acres in size and greater than 175 years old.**

Apply management activities in old growth only when the objective is enhancement of natural communities and old growth characteristics.

Salvage in designated old growth shall only occur when the area presents an unacceptable risk to public health or safety, or threatens forest health. The area treated must be the minimum necessary to mitigate the risk.

Regeneration Habitat

Intermediate harvests should generally leave the oldest and or largest trees to meet basal area objectives.

All even-aged regeneration harvests shall retain a minimum of 7%-10% of the harvest unit in reserve trees and/or reserve tree groups.

Reserve trees, or reserve tree groups, should include a combination of:

- The largest, long-lived species occurring on the site (pine, white oak, post oak, hickory, black gum);
- Standing dead trees; and
- Cavity or den trees.

Reserve trees and reserve tree groups should be spaced to mimic natural community structure and composition.

Reserve tree groups should include a combination of at least five trees. Where opportunities permit, locate some reserve tree groups within drainages.

Leave downed woody material on-site whenever possible.

Grassland Habitats

Natural Grasslands (glades, native prairies, and seeded or planted native grass on appropriate sites)

Emphasize the maintenance and improvement of natural grasslands as the preferred means of providing openland habitat.

Manage natural grasslands to enhance ground flora species diversity and abundance and minimize woody encroachment (see Desired Condition Chart in Appendix A).

When converting non-native openlands to natural grassland, at least 30% of the seed mix shall consist of a variety of native forbs appropriate to the site.

Maintain openlands within the WPZ and RMZ only if they are naturally occurring.

Minimize surface disturbing activities within 100 feet of the border of glades.

For fire suppression, use manually constructed firelines on and within 100 feet of glades unless mechanically constructed firelines are needed to protect life, private property, structures, public health, or firefighter safety.

Artificial Openlands (old fields, abandoned pastures, cool-season pastures, food plots)

Maintain or improve artificial openlands only where:

- they currently exist on NFS lands, or
- they exist on lands acquired in the future;

and where:

- conversion to natural grassland is not currently feasible,
- project-specific analysis shows a need for that habitat type, or
- they are needed to meet other resource objectives (i.e., rangeland forage or pastoral scenes).

Maintain or restore wildlife food plots only if they already exist, and are outside the WPZ or RMZ.

Close and rehabilitate existing wildlife food plots in the WPZ and RMZ.

Aquatic Habitat

Fishing Impoundments

Implement joint Missouri Department of Conservation (MDC) and Mark Twain National Forests Fisheries Management Plans for Beaver, Council Bluff, Crane, Fourche, Loggers, Pinewoods, and Ripley lakes.

Where determined to be a problem, aquatic species may be chemically controlled only when mechanical or biological control is impractical or not likely to be effective.

Streams and Rivers

Design aquatic habitat enhancement structures using natural appearing materials and placement to mimic the appearance and function of natural habitat features.

Use of heavy equipment to facilitate in-stream aquatic habitat improvement should be limited to the minimal amount of time essential for project completion.

Fish or other aquatic organism passage in streams shall not be blocked or prevented unless done in conjunction with prescribed fish-management objectives. Design fish management projects to minimize impacts on host species for threatened and endangered mussel species.

Remove large woody material from streams or streamsides only if it poses an immediate risk to water quality, degrades habitat for aquatic and riparian-associated wildlife species, or poses a public safety risk or a threat to private property or Forest Service infrastructures (i.e., bridges).

If suitable habitat is present, conduct specific biological surveys to determine the presence or absence of threatened, endangered or rare **aquatic**** species.**

Streams Identified by the State as Cold-water Stream Fisheries

Manage for naturalized trout species, including stocked trout, only in the cold-water streams listed in Table 2-1 (where management existed as of August 2002).

Table 2-1. Naturalized trout species managed in cold-water streams (where management existed as of August 2002).

Stream	Segment
Eleven Point River	Greer Spring Branch to Turner Mill
Eleven Point River	Turner Mill to Highway 160
Little Piney River	Phelps-Dent county line to Milldam Hollow Access
Little Piney River	Milldam Hollow Access to CR 7400
Spring Creek	Relfe Spring to Big Piney River
Mill Creek	Yelton Spring to Little Piney River
North Fork of the White River	Rainbow Spring to Forest Boundary
Roaring River	Roaring River State Park Boundary to Table Rock Lake
Stone Mill Spring	Entire length of spring

Manage only for native fish species in those cold-water streams not listed above (where trout did not exist as of August 2002). Do not introduce trout into these streams.

Timber harvest is prohibited in RMZs along self-sustaining trout streams.

Maintain, where possible, a canopy closure of 75-100% on all trout streams less than 25 feet wide.

Prohibit in-stream activities that could adversely affect trout spawning between November 15 and February 15 within self-sustaining trout streams.

Cool- and Warm-water Stream Fisheries

Manage cool-water streams to achieve self-sustaining smallmouth bass, goggle eye, and other naturally reproducing aquatic populations or other populations maintained by releases of hatchery-reared fish.

Manage warm-water streams to achieve a self-sustaining largemouth bass, bluegill, and other naturally reproducing aquatic populations.

Maintain a canopy closure of 50-100% on all permanent streams less than 25 feet wide, where possible.

Minimize in-stream management activities between March 15 to June 15 that could increase sedimentation and adversely affect spawning.

Geological Features

Caves and Abandoned Mines

Physical Protection and Management

Mechanically constructed firelines for prescribed burns shall be located at least 100 feet from known cave and abandoned mine entrances. Hand constructed firelines shall be located at least 50 feet from cave and abandoned mine entrances.

Designate an area of at least 10 acres completely surrounding a cave or abandoned mine entrance(s) as permanent old growth. This area should include the area above known or

suspected cave passages where possible. Vegetation management may occur only as part of natural community management to reach desired conditions (Appendix A).

All structures placed at cave entrances must permit bats to pass with minimal danger and must not alter airflow into or out of the cave, regardless if federally listed bats currently occupy the cave.

Evaluate abandoned mines for use by bats prior to permanent closure.

Prohibit the following within 100 feet of caves and abandoned mine openings:

- Storing construction waste, debris, and excess materials;
- Refueling equipment; and
- Applying fertilizers.

Prohibit timber harvest activities within 100 feet of the edge of a cave entrance.

Recreation

Except for regularly scheduled population monitoring, or other legitimate scientific purposes, do not allow or permit human entrance to Indiana bat hibernacula during the fall swarming, hibernation, and spring emergence period.

Except for regularly scheduled population monitoring or other legitimate scientific purposes do not allow or permit human entrance to gray bat hibernacula or summer caves during the periods of use by bats.

Locate new trails at least 100 feet from a cave entrance unless the trail leads to an overlook or other interpretive opportunity regarding the cave. When reconstructing or maintaining existing trails near caves, consider relocating the trail away from the cave.

Do not allow camping within caves or within 100 feet of a cave entrance.

TES Management

Maintain, and replace as needed, existing gates at occupied **threatened, endangered, candidate, proposed, or rare species of ** bat caves.

Designate an area of at least 20 acres completely surrounding **threatened, endangered, candidate, proposed, or rare species of ** bat cave entrance(s)—including the area above known or suspected cave or mine passages, foraging corridor(s), ridge tops, and side slopes around the cave for permanent old growth management. Within this area, only vegetation management activities needed to reach the desired condition are allowed.

Maintain an additional 130 acres of mature forest or mature woodland around each occupied **threatened, endangered, candidate, proposed, or rare species of ** bat cave.

Maintain or restore a mature forested corridor at least 100 feet wide and with at least 70% canopy closure between a cave used by gray bats and their foraging areas (streams and rivers). Within the corridor, allow only vegetation management activities needed to restore, enhance, or maintain mature forest or woodland natural communities.

The area around occupied **threatened, endangered, candidate, proposed, or rare species of ** bat caves is a smoke-sensitive area. Develop prescribed burn plans to avoid or minimize smoke influences at or near these caves. Give the U.S. Fish and Wildlife Service an opportunity to review and comment on prescribed burn plans within these areas.

Periodically assess all occupied **threatened, endangered, candidate, proposed, or rare species of ** bat caves to determine needs for physical protection of the cave entrance.

Periodically monitor all cave gates and protective structures to detect trespass, vandalism, or other situations that render those structures ineffective.

Mineral Management

Prohibit core drilling or other surface disturbing mineral operations over known caves and in the 20 acres designated **for permanent old growth management and the additional 130 acres maintained as mature forest or mature woodland around each occupied threatened, endangered, candidate, or proposed species of bat cave.**

Cliffs, Rock Bluffs, and Outcrops

Designate cliffs, rock bluffs, and outcrops as Management Prescription 8.1 areas when listed or qualified for listing in the Missouri Department of Conservation (MDC) Natural Heritage Database as a significant, exceptional, or notable natural feature.

Protect cliffs, rock bluffs, and outcrops from ground disturbing activities, unless those activities are needed to meet desired condition or to conduct safe fire suppression operations.

Minimize surface disturbance within 100 feet of cliffs, rock bluffs, and outcrops.

Locate new trails at least 100 feet from cliffs, rock bluffs, or outcrops unless the trail leads to an overlook or other interpretive opportunity regarding the natural feature. Consider relocating the trail away from these features when reconstructing or maintaining existing trails.

Springs, Seeps, Fens, Sinkholes, and Shrub Swamps

Designate springs, seeps, fens, sinkholes, and shrub swamps as 8.1 Management Prescription areas when the feature is listed or qualifies for listing in the MDC Natural Heritage Database as a significant, exceptional, or notable natural feature site.

Evaluate newly discovered fens and seeps and consider them for inclusion in the Missouri Department of Conservation (MDC) Natural Heritage Database.

Prohibit all mechanical disturbances on springs, seeps, fens, sinkholes, and shrub swamps, regardless of size.

Establish a buffer zone of 100 feet in radius from the outside edge of:

- **Small, isolated fens less than 400-square feet in size;**
- **Seeps greater than 200-square feet in size or which support associated natural communities;**
- **Springs;**
- **Sinkholes; and**
- **Shrub swamps.**

For fens greater than 400-square feet in area, and not designated as 8.1, establish a buffer zone of 300 feet on the lateral and downstream sides and 500 feet on the upstream side.

Within these buffer zones, prohibit the following activities, unless needed to meet specific restoration objectives:

- **Rangeland management, including grazing;**
- **Significant soil disturbance;**

- **Use of chemicals;**
- **Construction of new facilities or roads;**
- **Vehicle and heavy equipment use;**
- **Timber management activities;**
- **Storage of construction waste, material, debris or excess materials;**
- **Refueling of equipment; and**
- **Fertilizer application.**

Locate new trails within these buffer zones at least 100 feet from the feature's edge, unless the trail leads to an overlook or other interpretive opportunity regarding the wetland. When reconstructing or maintaining existing trails near these habitats, consider relocating the trail away from the wetland.

When a feature within these buffer zones has high public use, consider adding or improving trails to concentrate foot traffic or closing the area to public use.

Design roads so the runoff does not change natural hydrologic functioning of springs, seeps, fens, sinkholes, and shrub swamps.

If existing roads interfere with the natural flow of groundwater seepage and springs associated with adjacent fens and seeps, where feasible restore the natural hydrologic flow if such activities would not result in a loss of habitat.

Manage wetland natural communities that are fire-dependent (see Appendix A) with a fire regime (timing and intensity) similar to that with which the communities evolved.

Constructed Waterholes and Wildlife Ponds

Construct waterholes only where natural or constructed water sources are limited or lacking.

Manage and rehabilitate existing waterholes as a priority over constructing new ones.

When rehabilitating waterholes they should be irregular in shape and natural in appearance.

Place one or more brush piles or rock piles along the north bank of artificial ponds as needed to provide amphibian habitat.

Maintain several large (at least 4-inch dbh) pieces of downed woody material (logs, stumps, and large branches) along the north bank of constructed ponds, partially submerged in the water.

Remove trees and shrubs along the pond bank only if needed to prevent roots from penetrating the dam.

Prohibit wildlife pond construction within the RMZ or WPZ.

Prohibit pond fertilization within the RMZ.

Snags, Dens, Cavity Trees, and Downed Woody Debris

Whenever vegetation management is undertaken, leave standing dead trees, cavity or den trees, and downed woody material whenever possible, while providing for public safety and the achievement of resource management goals and objectives.

Prescribed Fire, Fuels, and Wildland Fire Management

Prescribed Fire

Additional management direction for prescribed fire can be found in Forest Service Manual 5140 and 5150, and the Forest Fire Management Plan.

Acres to be treated for hazardous fuel reduction must be near or adjacent to interface or intermix communities, in lands classified as fire regime 1, 2, or 3, and condition class II or III. Maintain lands classified as condition class I.

Emphasize large burns using year-round prescribed burning to meet management direction as appropriate to ecosystems involved and project objectives.

Allow fire to burn into all natural community types on compartment-size (or larger) prescribed burns. Allow fire to burn through sensitive natural communities, in designated old growth areas, and toward streams and drainages. Fires should be allowed to extinguish naturally within these areas unless otherwise needed to meet project specific objectives.

Threatened and Endangered Species

Fens that harbor known populations of Hine's emerald dragonfly should be prescribe burned to control invasion of woody species or as part of larger landscape restoration or enhancement projects.

Prescribed burns on fens that harbor known or suspected populations of Hine's emerald dragonfly must be scheduled to occur from November through April.

The area around occupied **threatened, endangered, candidate, proposed, or rare species of ** bat caves is a smoke-sensitive area. Develop prescribed burn plans to avoid or minimize smoke influences at or near these caves. Give the U.S. Fish and Wildlife Service an opportunity to review and comment on prescribed burn plans within these areas.

Prescribed burning may be done within the buffer zone for occupied Indiana bat male roost trees, if a fireline is manually constructed no less than 25 feet from, and completely around, the tree to prevent it from catching fire. (Reference Standards and Guidelines for Indiana bat in the Threatened, Endangered, and Sensitive species section of Terrestrial and Aquatic Wildlife.)

Firelines—Prescribed Fire

Where practical and safe for firefighters and the public, utilize existing natural or manmade barriers, such as drainages, cliffs, streams, roads, and trails instead of constructed firelines.

Encourage hand-constructed firelines where feasible and practical.

Locate firelines to minimize the need to remove standing dead trees before, during, or after prescribed burn operations.

Implement adequate erosion control measures (water bars, rolling dips, etc.) as shown in Table 2.2 on all constructed firelines where necessary to reduce the amount of sediment leaving a given area.

Table 2-2. Recommended spacing between drainage features.

Fire-line grade (%)	Distance between features (feet)
5 to 10	125
10 to 20	60
20 to 30	40
30 to 35	30

Firelines and water diversion structures must not drain directly into stream channels, sinkholes, or other specialized habitats.

Revegetate soils disturbed by constructed firelines by encouraging growth of existing on-site vegetation where possible.

Where on-site vegetation is not desirable, or not likely to quickly revegetate the site, use one or more of the following methods:

- **Fertilize to encourage growth of desirable on-site vegetation;**
- **Apply local surrounding organic mulch (i.e., leaf litter and pine needles) or cover with sterile weed-free straw to promote reestablishment of native vegetation;**
- **Reseed or replant with native species appropriate to the site or sterile annuals (wheat, rye, etc.) and fertilizing if necessary; or**
- **Scarifying to establish seedbed.**

Hand-constructed firelines shall be located at least 50 feet from cave and abandoned mine entrances.

Mechanically constructed firelines for prescribed fires are prohibited in the following areas:

- **Above known cave passages;**
- **On slopes greater than 35%, except for short runs with low erosion potential (for example, coming off of a road grade);**
- **Within 100 feet of known cave and abandoned mine entrances;**
- **Within 100 feet from the upslope break or crest of the sinkhole;**
- **Within 100 feet of sinkhole ponds, springs, seeps, fens, shrub swamps, rock bluffs, outcrops, cliffs, and glades,**
- **Within the RMZ; and**
- **Within known heritage resource sites.**

Mechanically constructed firelines for prescribed burns should avoid the WPZ whenever possible. When there is no feasible alternative, lines crossing these areas should not disturb the ground (i.e., lift the blade) for 50 feet on each side of the channel.

Mechanically constructed firelines for prescribed burns should avoid fragipan soils where feasible. For a list of fragipan soils See Appendix B.

If heritage resources or human remains are discovered during project implementation, halt the work near the find until a professional archaeologist assesses the situation.

Wildland Fire Suppression

Base wildfire prevention, detection, and suppression on the forest wide forest risk assessment. Base value-at-risk on the following criteria:

- Ignition probability;
- Proximity to Urban Interface or Intermix;
- Density of structures within the forest protection boundary;
- Response times;
- Fuel models; and
- Proximity to sensitive resources.

Define suppression action that is compatible with management area objectives and fire suppression action plans in cooperative agreements with other agencies. Reference Table 2-3.

When the value-at-risk is low, and the Fire Intensity Level (FIL) is two or less, suppression activities should be the least impacting that still achieve the objective, such as allowing the fire to burn to a natural or manmade fuel break. When the value-at-risk is medium to high, a variety of suppression activities may be used including, but not limited to construction of fire lines.

Each wildfire requires an appropriate suppression response.

Table 2-3. Mark Twain National Forest fire management direction.

Management Prescription	Wildland Fire <i>Unplanned Ignitions</i>						Prescribed Fire <i>Planned Ignitions</i>
	Wildland fire use authorized in fire management units with approved plans	Must be managed as unwanted wildland fires if either: human caused and approved fire use plan does not exist OR when fire presents unacceptable threat to human safety or values to be protected.					May be implemented by management action authorized by approved plans
		STRATEGIES AND TACTICAL OPTIONS					
		Perimeter Strategy	Area Strategy		ME	AR	Prescription Strategy
		Control	Confine or Contain	Monitor ⁶			
1.1	X	X	X	X	X	X	
1.2	X	X	X	X	X	X	
2.1	X	X	X	X	X	X	
5.1	X ¹	X ²	X	X ²	X ^{2, 3}		X ¹
6.1	X	X	X	X	X ⁴	X	X
6.2	X	X	X	X	X	X	X
6.3	X	X	X	X	X ^{4,5}		X
7.1		X			X ⁴		X
8.1	X ⁵	X	X	X	X ⁵		X ⁵

X = Allowed;

ME = Motorized Equipment

AR = Aerial retardant application

¹ Allowable only when approved in a signed Wilderness Fire Management Plan.

² Forest Supervisor must approve motorized equipment such as chainsaws, leaf blowers, mechanical transport and helicopter water drops.

³ The Regional Forest must approve the use of tractor plows and or dozers.

⁴ Requires District Ranger approval.

⁵ See standards and guides for each specific area.

⁶ Only when authorized for use in a designated fire management unit with an approved plan.

Coordinate banning of open burning on National Forest System lands with the Missouri Department of Conservation and the Ozark National Scenic Riverways.

For fires originating on private lands inside the Forest's fire protection boundary as defined under agreement with the Missouri Department of Conservation, provide the same suppression strategies as NFS land unless suppression measures are specifically qualified by the protection agreement.

Firelines—Suppression

Use existing natural or manmade barriers—such as drainages, cliffs, streams, roads, and trails—instead of constructed firelines for suppression activities when the value-at-risk is low and where practical and safe for firefighters and the public.

Avoid mechanical construction of firelines in natural areas whenever possible.

Standing dead trees that constitute a safety hazard for the public or for safe fire suppression operations may be cut or removed as necessary.

Implement adequate erosion control measures (water bars, rolling dips, etc.) on all constructed firelines where necessary to reduce the amount of sediment leaving a given area as shown in Table 2-4. Erosion control should occur as soon as possible after suppression activity is complete.

Table 2-4. Recommended spacing between drainage features.

Fire-line grade (%)	Distance between features (feet)
5 to 10	125
10 to 20	60
20 to 30	40
30 to 35	30

Revegetate soils disturbed by constructed firelines by allowing growth of existing on-site vegetation where possible and desirable.

Where on-site vegetation is not desirable, or not likely to quickly revegetate the site, use one or more of the following methods:

- Fertilize to encourage growth of desirable on-site vegetation;
- Apply local surrounding organic mulch (i.e., leaf litter, pine needles, etc.) or covering with sterile weed-free straw to promote reestablishment of native vegetation;
- Reseed with native species appropriate to the site or sterile annuals (wheat, rye, etc.) and fertilizing if necessary; or
- Scarify to establish seedbed.

Hand constructed firelines shall be located at least 50 feet from cave and abandoned mine entrances.

Unless necessary to protect life, structures, private property, or to maintain public and firefighter safety mechanically constructed firelines for suppression are prohibited:

- On slopes over 35% except for short runs with low erosion potential, (for example, coming off a road grade);
- Above known cave passages;
- Within 100 feet of known cave and abandoned mine entrances;

- **Within 100 feet from the upslope break or crest of the sinkhole;**
- **Within 100 feet of sinkhole ponds, springs, seeps, fens, shrub swamps, rock bluffs, outcrops, cliffs, and glades; and**
- **Within known heritage resource sites.**

Mechanically constructed firelines for suppression should avoid WPZ and RMZ, unless there is no feasible alternative. Firelines crossing these zones should not disturb the ground (i.e., lift the blade) for 50 feet on each side of the channel, unless necessary to protect life, structures, private property, or to maintain public and firefighter safety.

When using heavy equipment for suppression activities, cross stream channels at right angles. Stabilize and revegetate the crossing as soon as possible after the fire is controlled.

Do not apply fire retardants directly over water bodies unless needed for firefighter or public safety.

Water withdrawals are not permitted from natural sinkhole ponds.

Smoke Management

Use best available smoke management practices to minimize adverse effects on public health, public safety, or visibility from prescribed fire.

Conduct prescribed burning in, or adjacent to, counties with forecasted high Air Quality Index (AQI) values (AQI = orange or higher) only if meteorological conditions indicate that smoke will be carried away from the high AQI area.

Minimize the impact of smoke for each prescribed fire by identifying smoke-sensitive areas, using best available control measures, monitoring smoke impacts, and following applicable guidance.

Hazardous Materials

Additional management direction for handling of hazardous materials can be found in Forest Service Manual 2160, and in the Health and Safety Code Handbook (Forest Service Handbook 6709.11).

Any suspected uncontrolled or abandoned hazardous materials, sites, or contamination found on or near National Forest System lands shall be reported promptly to the Forest Service Law Enforcement and Investigation personnel.

Contracts, leases, and permits for occupancy of National Forest System lands shall contain clauses that prohibit or regulate the production, use, disposal, or storage of hazardous materials.

Pesticide Use

Additional management direction for pesticide use can be found in Forest Service Manual 2150 and Forest Service handbooks 2109.14, (Pesticide Use Management and Coordination Handbook), 6709.11 (Health and Safety Code Handbook), and 7109.11.

Include clauses requiring Forest Service approval of pesticide use in contracts and permits as needed.

Use pesticides only after alternative analysis clearly demonstrates that pesticide use is the most effective means to meet overall management objectives.

The use of pesticides must comply with the product label.

Areas treated with pesticides shall be signed, as appropriate, to ensure users are informed of possible exposure.

Aerial application of pesticide shall not be allowed unless approved by the Forest Supervisor based on an environmental analysis that has shown it is the only environmentally sound and biologically effective method practicable.

Use the least impacting application method needed for effective control of the target species.

Wash and rinse equipment used in the mixing and application of pesticides and fertilizers in areas where runoff will not reach surface waters, wetlands, fens, sinks, or special other habitats.

When using pesticides within the RMZ, WPZ, and within 100 feet of sinkholes, springs, wetlands, and cave openings adhere to the following:

- **Minimize the use of pesticides, herbicides, fertilizers, or hazardous materials;**
- **Use only pesticides labeled for use in or near aquatic systems; and**
- **Use only hand application and single plant application of herbicides and pesticides, unless other methods are approved by the forest supervisor based on environmental analysis that has shown they are environmentally sound and the most biologically effective method practicable.**

Rangeland Management

Additional management direction for rangeland resources can be found in Forest Service Manual 2200, as well as Forest Service Handbooks 2209.11 through 2209.15.

Modify allotment plans to accomplish Management Area goals.

Control the timing, duration, and intensity of livestock grazing to achieve desired structure and species composition objectives.

Modify or terminate permitted use when necessary to ensure native open woodlands and glades reach desired conditions as described in Appendix A.

Grazing permits should be adjusted to allow fuel buildup prior to prescribed burning.

Do not issue grazing permits for livestock other than cattle and horses.

Allow grazing only in those areas with adequate fencing for control and management of livestock.

Grazing is not allowed within 100 feet of springs, significant seeps, fens, other wetland features or the break of a sinkhole basin.

Grazing is allowed within the RMZ only under the following conditions:

- **Grazing may continue on existing improved pastures that are under an active permit as of September 2005;**
- **Livestock are fenced at least 100 feet away from stream banks; and**
- **Grazing on these allotments must be foreclosed at the earliest opportunity.**

Grazing shall not be allowed to degrade the RMZ or WPZ, or their functionality.

Reduce livestock impacts and achieve desired structure and species composition objectives within the WPZ and RMZ by using tools such as hardened crossings, fencing, and controlled timing, duration, and intensity of grazing.

Place livestock distribution tools such as feeding troughs, water troughs, salt and mineral blocks outside the RMZ, unless there is no other feasible alternative. Where there is no other feasible alternative, place livestock distribution tools so as to minimize use with the RMZ, unless needed to meet specific restoration objectives or desired conditions.

Place livestock distribution tools to minimize use within the WPZ, unless needed to meet specific restoration objectives or desired conditions.

Haying is allowed within the RMZ and WPZ only if it meets the management area direction and contributes toward meeting the desired condition.

Fertilization shall not be allowed within RMZ, WPZ, on glades or other natural communities.

Fertilization on cool season pastures should be done primarily for desirable legume establishment and maintenance.

Within allotments, retain all living shagbark hickory and shellbark hickory, white oak, lightning struck trees and cavity trees with a diameter 12 inches or more, unless necessary to protect structures, private property or to maintain public and firefighter safety.

Recreation Management

Additional management direction for recreation resources can be found in Forest Service Manual 2300, 2710, 2720, as well as Forest Service Handbooks 2309.18, 2309.23, and 2709.11.

Dispersed and developed recreation uses and resource management activities shall conform to the Recreation Opportunity Spectrum (ROS) classification for the management area in which it occurs. Occasionally, small structures that are out of character with the ROS class may be needed to provide for safety, resource protection, or visitor management needs.

Regulate use only to stay within the following carrying capacity, prevent site deterioration, maintain the ROS settings classification, protect sensitive resources, or provide for public health, safety, and enjoyment.

Manage visitor use to comply with the carrying capacities shown in Table 2-5:**Table 2-5. ROS Class Carrying Capacity**

ROS Class	Recreation Visitor Days (RVDs)/acre/year	
	Dispersed Recreation	Developed Recreation
Primitive	1.6	N/A
Semi-primitive Non-motorized	1.8	0.0
Semi-primitive Motorized (Terrestrial)	3.7	187.0
Semi-primitive Motorized (Water)	94.0	N/A
Roaded Natural (Terrestrial)	4.2	223.0
Roaded Natural (Water)	111.0	N/A
Rural (Terrestrial)	39.6	224.0
Rural (Water)	112.0	N/A

Make investments in recreation management as needed to meet the needs and desires of the public being served or targeted to be served at the facility, protect the site, follow riparian guidelines, and meet ROS classification objectives.

Provide recreation facilities only if needed to protect public health and safety; for site protection within ROS capacity levels; and, to meet documented demands of existing or targeted users.

Design facilities in conformance with the Visual Quality Objectives (VQOs) and the ROS classification of the site.

Landscaping projects in recreation areas and administrative facilities may use a wide variety of plant materials, including non-native species (providing these are not invasive species), although the use of native plants is preferred.

Drop fees and remove signs when services or facilities are not available or if collection of fees is not cost effective.

Encourage donations in areas where a fee system is not appropriate only if it is economically feasible or beneficial.

Apply the pack-in/pack-out philosophy to non-fee campgrounds, day use only developments, and dispersed activity areas whenever its success is likely.

Emphasize low-impact or no-trace camping in dispersed areas.

Do not allow camping within caves and 100 feet of a cave entrance.

Remove hazard trees between November 1 and April 1 whenever possible.

Allow use of metal detectors to search for treasure troves, and locating historical and prehistoric artifacts and features, only under a special-use permit.

Use of a hand-held metal detector as a recreational pursuit in search of coins of recent vintage (less than 50 years) and small objects having no historical value does not require a special-use permit when conducted on areas which possess no historic or prehistoric resources.

Periodically inspect sites and stabilize as needed using appropriate revegetation, traffic control, hardening, or site closure.

Riparian Management Zone (RMZ) and Watercourse Protection Zone (WPZ)

Avoid development of new recreation facilities and opportunities within the RMZ and WPZ.

If suitable locations outside the RMZ and WPZ are not feasible:

- Locate, construct, and maintain recreation facilities to minimize impacts on streams and riparian values and functions;
- Design new recreation development and improvements to existing facilities (including all types of trails) to minimize impacts on ecosystems;
- Plan recreation facilities improvements to be low-cost or flood-resistant in order to endure occasional flooding; and
- Avoid locating new sanitation facilities within the WPZ. If toilets are installed in the WPZ, the vaults must resist flooding and prevent leakage of waste water.

Within the RMZ:

- **Restrict facilities to low cost or flood resistant developments (i.e., boat ramps and trail and road crossings);**
- **As existing facilities are being replaced, evaluate them and relocate when possible;**
- **Prohibit construction of sanitation facilities;**
- **Prohibit new motorized trails except at designated crossings; and**
- **Locate stream crossings in areas that have a well-defined stream channel, minimal channel width, a low stream gradient, stable approaches, and stable banks on both sides of the proposed crossing.**

Rivers

The following direction applies to all waterways that are floatable for all or part of the year. This direction is further restricted if the waterway has been given a special classification (See Management Prescription 8.1) or is a candidate for special classification (See Management Prescription 6.3).

Protect and enhance recreational and scenery resources on National Forest System lands within at least one-quarter mile of the waterway, and on more distant lands that can be seen by water travelers.

When implementing management activities, make provisions so that the area remains natural appearing, practices or structures blend with the environment, and other applicable Forest Plan standards are met.

Trails

Emphasize completion of the National Forest portions of the Ozark Trail.

Evaluate trails for potential as national trails.

Design and designate trails to provide a variety of experiences.

Base decisions regarding trail development and management on documented demands.

Minimize trail signing, especially regulatory signs.

Develop trailheads to the minimum standard that serves the established use. Place primary emphasis on public safety by providing adequate parking space off roadways.

Decommission user-defined trails that are causing resource damage.

Locate new trails at least 100 feet from a cave entrance or wetland, unless the trail leads to an overlook or other interpretive opportunity regarding the natural feature. When reconstructing or maintaining existing trails near karst or wetland features, consider relocating the trail away from the feature.

When a wetland area has high public use, consider adding or improving trails to concentrate foot traffic, or closing the area to public use.

Off-Road Vehicles (ORVs)

Off-road vehicles that comply with State and local laws are allowed on all National Forest System roads that are open and have a National Forest System road number.

Other use of off-road vehicles on National Forest System lands is prohibited unless on designated off-road vehicle trails or the Chadwick Motorcycle Special Use area. Show motorized trails in the Transportation Atlas.

Visual Management

Additional management direction for visual management can be found in Forest Service Manual 2380.

Determine the Visual Quality Objective (VQO) for a specific area by referring to the visual quality matrix found in the standards and guidelines for each management prescription. Use variety classes and sensitivity levels as mapped for each district. They may be changed based on field conditions. Criteria for determining variety class and sensitivity level are documented in Forest Plan, Appendix G.

Resource management activities must meet or exceed the established VQO.

Allow a short-term reduction, the equivalent of one VQO, for central hardwood regeneration or similarly impacting activities. **Foreground sensitivity level 1 (fg1) or foreground sensitivity level 2 (fg2) areas must not be reduced below modification. Retain the original VQO for adjusted areas, and meet it within 20 years after initial entry into the corridor or viewshed. Residue treatment requirements must meet those specified for the original VQO.**

Within fg1 and fg2 areas with a VQO of retention or partial retention:

- **Mitigate negative visual impacts concurrently with or immediately after each phase or activity;**
- **Complete mitigating measures for each cutting unit or project area before beginning activities in the next sequential block or project area in the same corridor or viewshed; and**
- **Complete obligations specified by a contract or a project prescription within one year from initiation of activities for any single cutting unit or project area. Emphasize completing all work within these areas in a systematic manner within the shortest practical time.**

Within fg1 and fg2 areas with a VQO of modification, the standards are the same as above except the total lapsed time from initiation of activities to completion of obligations specified by a contract or a project prescription shall not exceed two years for any sale block or project area.

Where possible and feasible, rehabilitate undesirable landscapes to meet VQO. Prioritize projects as follows:

- (1) Sensitivity Level 1 travelway foreground areas
- (2) Developed Recreation Sites
- (3) Administrative Sites
- (4) Sensitivity Level 2 travelway foreground areas

Where possible and feasible, enhance visual variety in monotonous landscapes. Prioritize projects by sensitivity levels and distance zones.

Totally remove or chip and scatter residues generated within the near foreground (Nfg) zone in administrative or developed recreation sites.

Determine the Nfg zone for each project on a site-specific basis. Base the depth of this zone, which may extend up to 300 feet from the observation point, on the actual seen area, considering landform and vegetative screening.

Use secondary zones as needed to provide further visual mitigation for residue treatment. This secondary zone starts wherever the Nfg zone ends and extends up to the end point of foreground visual concern, but not greater than 600 feet in depth from the observation point.

Use the following travel speed classes to determine residue treatment needs:

- | | |
|-----------|---|
| 0-10 MPH | Hiking and riding trails, occupancy sites, and use areas. |
| 11-35 MPH | Low speed roads and motor vehicle trails. |
| 36-55 MPH | Moderate to high speed roads. |

Table 2-6. Maximum residue treatment heights (above ground surface) for designated travelways and use areas by sensitivity levels.

Visual Quality Objective - VQO	Distance Zone	Travel Speed MPH	Sensitivity Level 1 (Mandatory)	Sensitivity Level 2 (Mandatory)	Sensitivity Level 3 (Optional)
Retention - R	Nfg (0-300')	0-10 11-35 36-55	18 inches 24 inches 30 inches	N.A.	N.A.
	Secondary Zones (up to 600')	0-10 11-35 36-55	6 feet 8 feet 8 feet		
Partial Retention - PR	Nfg (0-300')	0-10 11-35 36-55	18 inches *30* inches *36* inches	30 inches 30 inches 36 inches	36 inches 36 inches 48 inches
	Secondary Zones (up to 600')	0-10 11-35 36-55	8 feet 8 feet 12 feet	10 feet 10 feet 12 feet	12 feet 12 feet 12 feet
Modification - M	Nfg (0-300')	0-10 11-35 36-55	N.A.	36 inches 48 inches 48 inches	48 inches 48 inches 48 inches
	Secondary Zones (up to 600')	All Speeds	N.A.	12 feet	N.A.
Maximum Modification - MM	Nfg (0-300')	All Speeds	N.A.	N.A.	48 inches
	Secondary Zones (up to 600')	All Speeds	N.A.	N.A.	N.A.

Heritage Resources

Additional management direction for recreation resources can be found in Forest Service Manual 2300 and FSH 2309.24, National Historic Preservation Act of 1966, as amended, and its implementing regulations found in 36 CFR 800 (NHPA).

Regulatory Compliance and Consultation

Comply with current Memorandum of Understanding (between the State Historic Preservation Office (SHPO) and Mark Twain National Forest), Programmatic Agreements, or other requirements regarding implementation of the forest heritage program.

Consult with the State Historic Preservation Office and Advisory Council on Historic Preservation regarding mitigation or treatment of significant heritage resources for which an adverse effect from forest projects is anticipated.

Consult with Native American groups and appropriate cultural or ethnic groups who may have a potential interest in heritage resources, including traditional cultural properties and sacred sites.

Inventory and Evaluation

Ensure that adequate heritage surveys are complete and assess project effects on significant heritage resources prior to decisions related to management activities.

Project activities should avoid known potentially significant heritage resources whenever possible, including sites which have not been evaluated or which have been determined to be eligible for listing in the National Register of Historic Places.

Where avoidance is not possible, consider project deferral or relocation as a means of protecting heritage resources.

Evaluate sites which cannot be avoided, or when project cannot be deferred or relocated.

Protection measures for sites determined to be eligible for the National Register must be developed and overseen by professional archaeologists.

If heritage resources or human remains are discovered during project implementation, the work shall be halted near the find until a professional archaeologist assesses the situation.

National Register Nominations

To ensure continued protection, designate as Management Prescription 8.1 significant heritage resources listed on the National Register of Historic Places.

Protection

Preserve and protect human remains in their original interred location.

If unintentional discovery of human remains occurs, follow provisions set forth in the Native American Graves Protection and Repatriation Act of 1990 and Provisions set forth in Chapter 214, Cemeteries, and Chapter 194, Unmarked Human Burials, Revised Statutes of Missouri.

Prior to any decision to remove a building or bridge, conduct an evaluation for the presence of **threatened, endangered, candidate, proposed, or rare species of**** bats.**

Timber Management

Additional management direction for timber management can be found in Forest Service Manual 2400, as well as Forest Service Handbooks 2409.11 through 2409.19.

Harvesting

Use silvicultural systems, harvest methods, and intermediate treatments to move the forest towards the desired condition. Base the decision on which type of systems, methods, and treatments to use on a particular site on management objectives, natural community type, stand conditions, and the silvical characteristics of the species present or desired. For a discussion of these practices and their application see Appendix D.

Designate as permanent old growth all stands or groupings of trees at least two acres in size and greater than 175 years old.

Apply management activities in old growth only when the objective is enhancement of natural communities and old growth characteristics.

Provide for sufficient shade and large woody material recruitment to meet WPZ objectives when developing silvicultural prescriptions.

Intermediate harvests should generally leave the oldest and or largest trees to meet basal area objectives.

All even-aged regeneration harvests shall retain at least 7%-10% of the harvest unit in reserve trees and/or reserve tree groups.

Reserve trees and reserve tree groups should include a combination of the following:

- The largest, long-lived species occurring on the site (pine, white oak, post oak, hickory, black gum);
- Standing dead trees; and
- Cavity or den trees.

Space reserve trees and reserve tree groups to mimic natural community structure and composition.

Include a combination of at least five trees in reserve tree groups. Where opportunities permit, locate some reserve tree groups within drainages.

Leave downed woody material on site whenever possible.

Rotation Ages

With the exception of Management Prescriptions 1.1 and 1.2, the following rotation ages should normally apply:

- 70 years for Red, Black, and Scarlet oak;
- 70 years for Shortleaf pine; and
- 90 years for Post and White oak.

Temporary Openings Created by Even-aged Regeneration Harvest

The maximum size of a temporary opening created by an even-aged regeneration harvest is 40 acres except as provided for in Management Prescriptions 1.1 and 1.2 or as noted below.

Temporary openings created by even-aged regeneration harvest in excess of the maximum size allowed by management prescription standards and guidelines may occur if one of the following applies:

- On an individual sale basis after 60 days public notice and review by the Regional Forester; and
- In areas of salvage or sanitation activities resulting from disturbance events caused by fires, weather events, or outbreaks of disease or insect attacks.

A temporary opening created by even-aged regeneration harvest is:

- **a clearcut,**
- **a seed tree cut, or**
- **a shelterwood cut with a total basal area (including reserve trees) of less than 50.**

Although not defined as a temporary opening, shelterwoods with a total basal area greater than 50 should be 40 acres or less in size.

Do not locate new even-aged regeneration harvest temporary openings adjacent to existing temporary openings when the combined total of the areas exceeds the maximum opening size.

Separate temporary openings by a stand of at least manageable size and configuration (normally 10 acres or larger).

Temporary openings should be at least 330 feet apart.

A temporary opening shall no longer be considered a temporary opening when the stand has reached a height of 15 feet.

Not more than 10 chains (660 feet) of temporary opening may occur along any 40 chains (0.5 miles) of a hiker or horse trail (including the Ozark Trail) during a decade.

Reforestation

When shortleaf pine seeding or planting is prescribed, use genetically improved seed or stock developed from native Mark Twain National Forest superior trees.

Adequate advanced regeneration should be present in oak types where a final regeneration harvest is prescribed.

Mechanical site preparation that exposes bare soil on more than 25% of the treated area is not allowed.

Timber Stand Improvement

Release treatments for even-aged management should be made only once per rotation. The treatments should be made no later than 10 years of age for pine stands, and no later than 15 years of age for hardwood or hardwood-pine stands.

Precommercial thinning for even-aged management should only be scheduled in stands that will not be merchantable within 10 years.

Apply precommercial treatments to each entry to achieve structural objectives for stands managed under uneven-aged silvicultural systems.

Management objectives should be met through commercial practices or through firewood cuts when feasible.

Salvage

Salvage timber resources damaged by natural or man-caused disturbance events when salvage activities are compatible with overall resource goals and objectives, management prescriptions, or to protect public safety.

Plan salvage activities to leave at least 10%-15% of the affected area, unless the area presents an unacceptable risk to public health or safety, or threatens forest health. These areas should be in a variety of patch sizes and distributions on the landscape.

Salvage of dead or dying timber and other sanitation removals may occur in the RMZ, when the riparian values are protected and the activities are needed to protect public safety, resource values, and maintain the health of the forest.

Salvage in designated old growth shall only occur when the area presents an unacceptable risk to public health or safety, or threatens forest health. The area treated must be the smallest amount necessary to mitigate the risk.

Sale Preparation and Administration

Design and implement all ground-disturbing activities to prevent or minimize soil dislocation, compaction, rapid runoff, disruption of water movement, and distribution or loss of water and soil quality.

If heritage resources or human remains are discovered during project implementation, halt the work near the find until a professional archaeologist assesses the situation.

Prohibit timber harvest activities within 100 feet of the edge of a sinkhole, cave entrance, or within the buffer zone for wetland features. (Reference: Forestwide Standards and Guidelines for Geological Features under Terrestrial and Aquatic Wildlife management.)

Allow timber management activities within the RMZ only to move the area towards the desired condition.

Restrict equipment operation within the WPZ and RMZ to designated crossings or other approved locations.

Mechanized equipment may make one to two passes off designated skid trails within the WPZ when needed to facilitate management activities, but not within the 25-foot buffer zone.

Ensure all equipment used for harvesting and hauling operations is serviced outside of the RMZ and WPZ.

Within 25 feet of a WPZ stream channel:

- **Do not cut trees, unless necessary to move the area towards the desired condition or to facilitate designated crossings; and**
- **Do not operate mechanized equipment, except at designated skid trail locations.**

When possible, avoid cutting trees that are anchoring the banks of all drainages, including those that are not within the RMZ or WPZ. If these trees must be cut, the stump and root system should be left in place and intact whenever possible.

Remove tops from drainages within the RMZ and WPZ, and avoid concentrations of tops and slash in drainages outside the RMZ and WPZ.

National Recreation Trails

Restrict logging activity to leaf-off periods within the near foreground of National Recreation Trails.

Prohibit vehicles on National Recreation Trails except at approved trail crossings.

Leave flowering and colorful vegetation species within the near foreground zone of National Recreation Trails whenever feasible.

Where feasible, place paint marks used for identification of project work on the side of the tree away from the trail so marks are not visible from the trail.

Temporary Roads

Temporary road management direction is documented under Forestwide Standards and Guidelines for Transportation System.

Skidding and Skid Trails

Suspend operations during wet periods when excessive rutting and soil displacement are anticipated.

When removing felled trees from areas of soils with high rutting or compaction potential, methods must be used which minimize rutting or displacing soil (i.e., use of low ground pressure skidders, operate when the ground is dry or frozen). Soils with a high compaction potential are listed in Appendix B.

Skidder operation is prohibited on slopes over 35%.

Do not use stream channels or drainages as skid trails or temporary logging roads.

Skid trails should not drain directly into roads, areas of disturbed mineral soil, sinkholes, fens, springs, or watercourses.

Do not use recreation trails as skid trails or temporary logging roads.

Where skidding across a recreation trail is unavoidable, it shall be at a right angle and at designated locations.

Prohibit skid trails within 100 feet of the edge of a sinkhole, cave entrance, or other karst feature, or within the buffer zone for wetland features. (Reference Forest-wide Standards and Guidelines for Geological Features under Terrestrial and Aquatic Wildlife management.)

Keep erosion control work as up to date as practical.

Implement adequate erosion control measures on skid trails to reduce the amount of sediment leaving a given area (see table 2-7).

Table 2-7. Recommended spacing between drainage features.

Skid-trail grade (%)	Distance between features (feet)
5 to 10	125
10 to 20	60
20 to 30	40
30 to 35	30

National Recreation Trails

Provide at least 600 feet between skid trails crossing National Recreation Trails, except where topography requires occasional approval of closer trails.

Revegetation

Revegetate soils disturbed by National Forest management activities by allowing growth of existing on-site vegetation where possible and desirable.

Where on-site vegetation is not desirable, or not likely to quickly revegetate the site, use one or more of the following methods:

- **Fertilize to encourage growth of desirable on-site vegetation;**
- **Apply local surrounding organic mulch (i.e., leaf litter and pine needles) or covering with sterile weed-free straw to promote reestablishment of native vegetation;**

- **Reseed or replant with native species appropriate to the site or sterile annuals (wheat, rye, etc.) and fertilizing if necessary; or**
- **Scarify to establish seedbed.**

Landings

Log landings are prohibited within 100 feet of a recreational trail.

Locate log-decking areas so they are not visible from National Recreation Trails.

Locate log landings outside of the WPZ and RMZ.

Special Uses Management

Additional management direction for Special Uses can be found in Forest Service Manuals 2710, 2720, 2730, 2770 and Forest Service Handbooks 2709.11, 2709.12, 2709.15 and 36 CFR 251 subpart B and C.

Permit special uses only when they comply with standards and guidelines for the management area prescription; do not result in environmental or resource degradation; do not preclude opportunities for ecosystem management; and where locations on non-National Forest System lands are not reasonably available.

Competitive and Organized Events

Do not permit motor vehicle events with speed as the determining factor.

Permit competitive events only if they are skilled events and are sanctioned by a State, regional, or national association.

Permit competitive events only in areas of the forest or at times of the year that do not conflict with recreation or other management considerations.

Research

Permits are required for collecting non-listed plants and animals for scientific research.

Permits for the collection of federally listed threatened and endangered plant and animal species shall not be issued unless the collector has a current U. S. Fish and Wildlife Service collecting permit.

Permits for collection of Regional Forester Sensitive Species and State endangered plant and animal species shall only be given for scientific research.

Transportation System Uses

When issuing special use road permits, use the Transportation Atlas to determine the type of special use road permit or easement to be issued.

The Forest Service should perform maintenance of National Forest System roads used for access to private property unless the maintenance schedule will not meet the minimum needs of the private user, in which case:

- **County maintenance by agreement should be negotiated by the user;**
- **Should these negotiations fail a temporary permit may be issued for maintenance in cases requiring infrequent maintenance; or**

- **If frequent maintenance is required, issue an easement or permit to provide for maintenance by the landowner. Cancel the permit when Forest Service maintenance meets the user's needs, the road no longer requires frequent maintenance, or the County assumes maintenance responsibility.**

Do not authorize use of pesticides by permittees for maintenance of special use roads.

Permits or easements on unclassified roads

Use of the road may include construction, reconstruction, or maintenance of existing roads not included as a part of the National Forest System road network.

The permittee shall be responsible for road construction, reconstruction, or maintenance.

The road may be closed to public use.

Design and maintenance standards shall meet the permittee's minimum needs and minimize adverse impacts to other National Forest resources.

Permits for construction or reconstruction on National Forest System roads

Issue permits only for construction or reconstruction of National Forest System roads.

Construction or reconstruction shall be in accordance with Forest Service design standards.

Terminate the permit when construction has been completed and approved by the Forest Engineer or his designee.

Roads should be open to public use.

Utility Transmission and Distribution Line Corridors

Bury all telephone lines, utility lines, and power transmission lines whenever practical. Where burial of facilities is not practical, emphasize rerouting or screening.

Require permittees to remove abandoned facilities in a timely fashion.

To the extent possible, place utility developments within road rights-of-way, transportation corridors, or existing utility corridors

Multi-facility corridor width shall be less than one-quarter mile.

Provide utility company personnel access on roads closed to public with approval by a Forest Service representative as appropriate to meet utility maintenance needs.

The Right of Way (ROW) permittee shall be responsible for all maintenance.

All utility line ROWs 40 feet or more in width should be managed to enhance wildlife habitat diversity by providing openland habitat as specified by the District or Forest Wildlife Biologist.

Permittee shall revegetate soils disturbed by management activities by encouraging growth of existing on-site vegetation where possible.

Where on-site vegetation is not desirable, or not likely to quickly revegetate the site, use one or more of the following methods:

- **Fertilize to encourage growth of desirable on-site vegetation;**

- Apply local surrounding organic mulch (i.e., leaf litter and pine needles) or covering with sterile weed-free straw to promote reestablishment of native vegetation;
- Reseed or replant with native species appropriate to the site or sterile annuals (wheat, rye, etc.) and fertilizing if necessary; or
- Scarify to establish seedbed.

Maintain pipeline ROW vegetation by encouraging low, native shrubs along the ROW edges.

Use prescribed fire for maintaining pipeline ROWs only when they are not transporting flammable substances.

Minerals

Additional management direction regarding federal minerals can be found in Forest Service Manual 2800.

General

All lands are available for non-surface disturbing mineral activities.

Surface disturbing exploration may be permitted where it is compatible with the management area direction. The reason for closing an area to land-disturbing exploration must be supportable and documented.

Forest Service consent to both lease requests and subsequent operating plans for mineral extraction must be determined individually, based on the relative value of the surface and subsurface resources and on compliance with the standards and guidelines as determined by a site specific analysis for each action.

Apply additional stipulations to the U.S. Department of the Interior (USDI), Bureau of Land Management (BLM) permits, or leases as needed to meet the management area objectives.

All surface-disturbing mineral activities must have a Forest Service approved Plan of Operation or Surface Use Plan that includes a reclamation plan.

Approval of significant surface impacts must be based on reasonable and verifiable proof that the mineral values justify the proposed operation.

Reclamation on any mineral operation site should commence as soon as impacts on any part of the site are completed. Consequently, reclamation should keep pace with ongoing mineral activity.

After mineral operations have been completed, all facilities shall be removed from the site. The disturbed area shall be reclaimed to prevent erosion and sedimentation. The site shall be re-contoured when necessary. The site shall be revegetated to meet management area objectives.

Revegetate soils disturbed by minerals activities by allowing growth of existing on-site vegetation where possible and desirable.

Where on-site vegetation is not desirable, or not likely to quickly revegetate the site, use one or more of the following methods:

- Fertilize to encourage growth of desirable on-site vegetation;

- **Apply local surrounding organic mulch (i.e., leaf litter and pine needles) or covering with sterile weed-free straw to promote reestablishment of native vegetation;**
- **Reseed or replant with native species appropriate to the site or sterile annuals (wheat, rye, etc.) and fertilizing if necessary; or**
- **Scarify to establish seedbed.**

Conduct and document routine compliance inspections as necessary.

Issue required road use permits and other special use permits. See special uses management, Transportation System Uses.

Temporary road management standards are documented under Forestwide Standards and Guidelines for Transportation System Management.

Merchantable timber removed from the sites must be paid for at appraised rates.

Avoid drilling, drill pad construction, and structures within the WPZ when possible.

Drilling, drill pad construction, and structures are prohibited within the RMZ.

Restrict equipment operation within the WPZ and RMZ to designated crossings or other approved locations.

Prohibit surface-disturbing mineral activities within 100 feet of the edge of a cave entrance, spring, seep, fen, sinkhole, or shrub swamp.

Land management decisions must not preclude the ability of private mineral owners to make reasonable use of the surface as defined by deed and public law.

Recreational collection is generally not allowed in leased or permitted areas, natural areas, or caves.

Gold panning may involve the pan only. Picks, shovels, mechanical and motorized equipment is prohibited. Disturbance of stream banks is prohibited.

If heritage resources or human remains are discovered during project implementation, halt the work near the find until a professional archaeologist assesses the situation.

Hardrock Leasable Minerals

Do not allow surface disturbing mineral operations on administrative sites, within developed recreation sites, on known endangered and threatened species sites, on National Trails Systems or over known caves or sinkholes.

Require standard and site-specific stipulations for all permits and leases. Standard Stipulations are described in Appendix C.

Salables: Common Variety Mineral Materials

Limit the use of common variety minerals to the needs of the Forest Service, and other public agencies, when the proposed action benefits National Forest management. Private personal uses are exceptions when quantities are minor and removal is compatible with management area direction.

When consistent with management area direction, allow the low-volume removal of surface stone for personal use at a minimum price or appraised price on Contract for Mineral Material, form 2800-9.

Do not use caves, sinkholes, and other karst features when locating new common variety disposal locations or pits.

Only allow common variety mineral operations if consistent with Management Area direction and no other resource areas are available on private land.

Removal of mineral materials, such as sand and gravel, from stream channels or RMZ's is prohibited, unless needed for protection of infrastructure or for public health and safety.

Law Enforcement

Management direction for Law Enforcement can be found in Forest Service Manual 5300 Law Enforcement, Forest Service Handbook 5309.11, Law Enforcement handbook, 36 CFRs 261, closure orders, and the Forest Law Enforcement Plan.

Landownership

Additional management direction for Lands can be found in Forest Service Manual 5400, 5500, 7150, and Forest Service Handbooks 2709.12, 2709.15, 5409.13 and 5409.17.

Surface Ownership

Land Adjustment

Allocate all acquired lands to the Management Prescription of the surrounding NFS lands.

Land purchase or exchange must satisfy one or more of the following:

- **Accomplish objectives of public law or regulation;**
- **Meet demand for National Forest System resources;**
- **Result in more efficient landownership patterns; or**
- **Result in lower resource management costs.**

Acquire fee title to lands whenever possible. If fee title purchase is not possible, purchase partial interests when it serves long-term resource management objectives.

Acquisitions should generally be on a willing seller basis. Exceptions may be necessary to:

- Acquire critical rights-of-way;
- Meet legislative requirements; or
- Acquire land or interest in land essential to manage and protect important public resources.

Any proposal for condemnation of fee title lands in these categories shall require public involvement to determine the importance of National Forest management over the lands in question.

To achieve more efficient landownership and lower resource management costs, consider as high priority for exchange or disposal isolated Federal tracts located in areas where private land use precludes future consolidation.

Land acquired through exchanges or purchase programs should generally be confined to tracts within areas of predominately NFS lands.

Acquisition

Lands acquired under the authority of the Weeks Act with purchase funds and the land for timber exchange program should meet one or more of the following criteria:

- Adjacent to other National Forest land;
- Eliminate property lines and corners;
- Eliminate needed road rights-of-way;
- Resolve trespass;
- Eliminate special use permits or anticipated permits;
- Unimproved property or improvement value is less than 10% of the total appraised value;
- Relocation costs are less than 10% of the total appraised value;
- Have no or minimal reservations; or
- Have minimal title problems.

Prioritize lands and interests in lands acquired under the Land and Water Conservation Fund Act as follows:

1. Located within a Congressional designated area;
2. Located within management areas having high priority for river recreation acquisition;
3. Includes habitat for threatened and endangered species; or
4. Tracts primarily valuable for outdoor recreation purposes and to conserve fish, wildlife, and plants.

Exchange Program

To be included in the land for land exchange program, the proposal shall meet the following criteria:

- **Be recommended in writing by the District Ranger specifying advantages, disadvantages, and justification, and approved by the Forest Supervisor;**
- **Authorized by an exchange act; and**
- **At a minimum proponent should, be willing to pay costs for title work, publishing exchange notice in local newspaper, any necessary surveys of the non-federal tract and willing to provide additional land or cash to equalize the exchange.**

Rank proposals meeting the above criteria according to the following:

- Are isolated tracts located in areas where consolidation is doubtful;
- Eliminate trespass;
- Are within a special management area;
- Eliminate needed road rights-of-way;
- Eliminate special use permits; or
- Eliminate property lines and corners.

On Federal lands having exchange potential, hold investments to the lowest level that meets resource protection needs and responds to unavoidable management requirements. Use

existing and temporary access to the extent possible. Restrict new road development to roads needed for other ownerships, or to meet associated objectives of retained lands. Invest in resource management only to the degree it is profitable on the short-term.

Avoid encumbering National Forest System land available for exchange with public or private uses that reduce exchange opportunities.

Access

Acquire temporary right of way only where there is an immediate need for access to National Forest System lands, or where the need does not justify the expenditure to provide permanent public access.

Property Lines

Additional direction is found in FSM 7150.

Handle each occupancy encroachment case as promptly as time and funds permit to protect the interest of the United States and to grant appropriate administrative relief for valid title claims.

When there is mutual agreement regarding the property line and ownership, but an encroachment is evident, pursue one of the following:

- If no improvements are present have the property vacated;
- If minor improvements are present, have the property vacated only if it serves the public interest;
- If disposal of tracts with minor improvements best serves the public interest, evaluate them for eligibility to sell or interchange under the Small Tracts Act; or
- If significant improvements are present on a tract, evaluate it for eligibility to sell or interchange under the Small Tracts Act.

Subsurface Ownership

Consider subordination or acquisition of subsurface rights when all of the following are met:

- Conflicts between surface values and mineral activities cannot be mutually resolved; and
- The public benefits from the surface values exceed the cost of acquiring subsurface rights.

Reserve subsurface rights in land exchanges only when high potential for mineral deposits occur in the vicinity.

Acquire subsurface rights in all fee purchases and exchanges if possible. Important acquisitions for surface objectives should not be foregone if subsurface rights are not offered for sale.

When acquiring property with subsurface reservations minimize the commodities reserved and the time period of the reservation.

Transportation System

Additional management direction for roads can be found in 36 CFR212.1, Forest Service Manual 7700, and Forest Service Handbooks 7709.55 through 7709.59.

The Transportation Atlas shows the current road network on the forest. Any management activity that modifies the transportation atlas, such as adding new National Forest System roads or decommissioning unclassified roads, should be informed by a roads analysis, according to FSM 7710.

Motorized use of National Forest System roads is allowed in accordance with State law and closure orders.

Restrict vehicle travel on roads as needed due to environmental concerns, lack of funding, user conflicts, or to achieve ROS objectives.

Commercial users of roads shall perform their share of road maintenance, per Forest Service Manual 7732.

If heritage resources or human remains are discovered during project implementation, halt the work near the find until a professional archaeologist assesses the situation.

National Forest System Roads

Planning and Design

Use minimum road construction, reconstruction, and maintenance standards necessary to meet management area objectives, protect area resources, accommodate design vehicles, and provide safe and efficient travel.

Schedule road construction, reconstruction, and maintenance to take advantage of favorable weather and ground conditions, and to avoid high stream flows.

Existing roads should be used in preference to the construction of new ones.

Locate new roads outside the RMZ and WPZ, unless there is no feasible alternative.

Design local roads to conform to natural contours of the land and meet the needs of the design vehicle, utilizing broad based dips and outcrops for drainage in lieu of culverts. Justify higher local road standards on a case-by-case basis.

Design roads so the runoff does not change natural hydrologic functioning of karst or wetland features.

Determine location of new roads near fens containing known or suspected habitat for Hine's emerald dragonfly during consultation with U.S. Fish and Wildlife Service.

Whenever possible, avoid road construction:

- Above known cave passages;
- Within 100 feet of known cave and abandoned mine entrances;
- Within 100 feet from the upslope break or crest of the sinkhole, other karst feature, rock bluffs, outcrops, or cliffs;
- Within 100 feet of glades;

- Within the buffer zone for wetland features, (Reference Forestwide Standards and Guidelines for Geological Features under Terrestrial and Aquatic Wildlife management.); and
- Within, or near, collapsed features or losing streams.

If existing roads interfere with the natural flow of groundwater seepage and springs associated with adjacent fens and seeps, restore the natural hydrologic flow where feasible if such activities would not result in a loss of habitat.

Reconstruction or Construction

Construct road grades at less than 10%, although steeper grades may be suitable for short sections of road.

Design and construct drainage features so that run-off water is spread, retained, or infiltrated below or beyond drainage features. Install drainage features at appropriate intervals to prevent erosion.

Where feasible, relocate roads away from known cave entrances during road reconstruction or maintenance activities.

Construct temporary pools at the end of outlet ditches whenever possible.

Bridges proposed for construction or reconstruction across streams that are 40 or more feet wide should be designed of concrete with girders or chambers to provide suitable bat roosting space underneath whenever possible.

Revegetate soils disturbed by National Forest management activities by allowing growth of existing on-site vegetation where possible and desirable.

Where on-site vegetation is not desirable, or not likely to quickly revegetate the site, use one or more of the following methods:

- **Fertilize to encourage growth of desirable on-site vegetation;**
- **Apply local surrounding organic mulch (i.e., leaf litter and pine needles) or covering with sterile weed-free straw to promote reestablishment of native vegetation;**
- **Reseed or replant with native species appropriate to the site or sterile annuals (wheat, rye, etc.) and fertilizing if necessary; or**
- **Scarify to establish seedbed.**

Maintenance

Determine maintenance level by functional class, traffic volume, management area guidelines, associated resource outputs, and available funding.

Maintain roads to a level necessary for Forest generated traffic. When public traffic is generated by non-forest activities, contact and work with the appropriate county to assume their share of maintenance responsibilities.

Maintain roads to at least Maintenance Level III if passenger car travel is intended.

Maintain all roads in a condition that protects the Government investment unless an economic analysis determines that deterioration and future reconstruction is more cost-effective.

Hazard trees should be identified and removed between November 1 and April 1 whenever possible.

Stream Crossings within WPZ or RMZ

Consider fords only where permanent roads receive low or intermittent use, and use is restricted to low-flow periods.

Fords should only be used where stream bottom conditions can support this use.

Where stream crossings are necessary, roads should cross at right angles, perpendicular to the flow of water, with minimal disturbance of the stream banks and bed.

A stream crossing must include mitigating measures, which protect the channel from disturbance and the road from storm-flow.

Design crossings to:

- Allow passage of large woody material, bed load and floating debris, when possible;
- **Maintain stable channel configurations, native local substrates, and native vegetation;**
- **Carry expected storm flows; and**
- **Provide passage for aquatic and semi-aquatic organisms (i.e., fish, crayfish, shellfish, salamanders, and turtles).**

Whenever possible, conduct in-stream construction activities from August through October and avoid the period between March and June, to avoid disrupting aquatic species during spawning season.

Allow equipment operation within the RMZ only at designated crossings or other approved locations.

If suitable habitat is present, conduct specific biological surveys to determine the presence or absence of threatened, endangered or rare **aquatic**** species prior to initiating work.**

Temporary Roads

Stream channels and drainages shall not be used as travel ways for any mechanized equipment.

Temporary roads are prohibited within the RMZ and WPZ except at designated locations.

Minimize stream channel crossings by temporary roads within the RMZ or WPZ.

Locate stream channel crossings within a stable reach and harden if needed.

Remove hardening material and restore the original contours of the banks and approaches when practical and as needed.

The Forest Service must approve layouts of any temporary access under permit, lease, or contract before construction.

Whenever possible, avoid temporary road construction:

- Above known cave passages;
- Within 100 feet of known cave and abandoned mine entrances;
- Within 100 feet from the upslope break or crest of sinkholes, other karst features, rock bluffs, outcrops, or cliffs;
- Within 100 feet of glades;

- Within the buffer zone for wetland features (reference: Forest-wide Standards and Guidelines for Geological Features under Terrestrial and Aquatic Wildlife management); and
- Within or near collapsed features or losing streams.

Intermittent springs and seeps that appear during or after construction of temporary roads may be drained to avoid erosion during the period they are in use.

Temporary roads should be designed and located so they do not change natural hydrologic functioning of karst or wetland features.

Temporary roads should not drain directly into roads, areas of disturbed mineral soil, sinkholes, fens, springs, other small wetlands, or watercourses. Install drainage features at appropriate intervals to prevent erosion.

Erosion control work should be kept up to date to minimize soil movement.

Decommission temporary accesses when no longer needed for the purpose for which it was developed.

Unneeded Roads

All unneeded roads under Forest Service jurisdiction should be decommissioned.

Priority for decommissioning shall be given to those roads that pose the greatest risk to public safety or where use is causing unacceptable resource damage.